

CLAIMS

What is Claimed is:

1. A winding end cap assembly for an electric machine that includes a stator with stator poles, comprising:

first and second end caps that are connected to opposite axial end surfaces of one of said stator poles; and

5 a first inner winding retainer section that extends axially to connect an inner end of said first end cap to an inner end of said second end cap.

2. The winding end cap assembly of claim 1 further comprising:

a second inner winding retainer section that extends axially to connect said inner end of said first end cap to said inner end of said second end cap.

3. The winding end cap assembly of claim 2 wherein said first and second end caps include an outer section, an inner section and a hub section that connects said outer section to said inner section.

4. The winding end cap assembly of claim 3 wherein said winding end cap assembly is made of a magnetically insulating material and said electric machine is a switched reluctance electric machine.

5. The winding end cap assembly of claim 4 wherein said stator of said switched reluctance electric machine is segmented and includes a plurality of stator segment assemblies.

6. The winding end cap assembly of claim 5 wherein said stator segment assemblies comprise a stator segment core including a stack of stator plates that have a radially outer rim section and a tooth section that extends radially inwardly from a center portion of said radially outer rim section.

7. The winding end cap assembly of claim 6 wherein said outer sections of said first and second end caps align with said outer rim section of said stator plates, said inner sections of said first and second end caps align with radially inner ends of said tooth section of said stator plates, and said hub sections of said first and second end caps align with said tooth section of said stator plates.

8. The winding end cap assembly of claim 6 wherein said first and second inner winding retainer sections extend axially along circumferential projections on a radially inner end of said tooth section of said stator segment core.

9. The winding end cap assembly of claim 3 wherein said outer section of said first end cap receives first and second terminals for connecting to opposite ends of winding wire.

10. The winding end cap assembly of claim 2 wherein said first and second end caps and said first and second inner winding retainer sections are molded integrally.

11. The winding end cap assembly of claim 3 wherein said first and second end caps and said first and second inner winding retainer sections define a continuous annular channel that receives winding wire.

12. The winding end cap assembly of claim 3 further comprising:
first and second outer retainer sections that connect said first and second end caps adjacent to said outer sections of said first and second end caps.

13. The winding end cap assembly of claim 3 wherein said outer section includes a cavity.

14. The winding end cap assembly of claim 3 wherein said outer section includes a groove on a radially outer surface thereof.

15. A switched reluctance electric machine comprising:
a stator including a plurality of stator segment assemblies each with a
stator segment core; and
an end cap assembly that includes first and second end caps that are
5 attached to opposite axial end surfaces of said stator segment core and a first inner
winding retainer section that extends axially to connect an inner end of said first end cap
to an inner end of said second end cap.

16. The switched reluctance electric machine of claim 15 wherein said first
and second end caps include an outer section, an inner section and a hub section that
connects said outer section to said inner section.

17. The switched reluctance electric machine of claim 16 further comprising:
first and second outer retainer sections that connect said first and second
end caps adjacent to said outer sections of said first and second end caps.

18. The switched reluctance electric machine of claim 16 wherein said outer
section of said first end cap receives first and second terminals that are connected to
opposite ends of winding wire.

19. The switched reluctance electric machine of claim 15, further comprising:

winding wire that is wound around said stator segment core and said end cap assembly; and

5 insulation that is located between said winding wire and said stator segment core.

20. A stator segment assembly for a stator of a switched reluctance electric machine comprising:

a stator segment core that includes a radially outer rim section and a tooth section that extends radially inwardly from a center portion of said radially outer

5 rim section; and

an end cap assembly that defines a continuous annular channel and that includes first and second end caps that are positioned adjacent to opposite axial end surfaces of said stator segment core and first and second inner winding retainer sections that extend axially to connect inner ends of said first and second end caps together,

10 wherein said first and second inner winding retainer sections engage inner ends of said tooth section.

21. The stator segment assembly of claim 20 wherein said first and second end caps include an outer section, an inner section and a hub section that connects said outer section to said inner section.

22. The stator segment assembly of claim 21 further comprising:

first and second outer retainer sections that connect said first and second end caps adjacent to said outer sections of said first and second end caps.

23. The stator segment assembly of claim 20 wherein said outer section of said first end cap receives first and second terminals for connecting opposite ends of winding wire.

24. The stator segment assembly of claim 20 further comprising:
winding wire that is wound in said continuous annular channel; and
insulation that is located between said winding wire and said stator
segment core.

25. A stator for a switched reluctance electric machine comprising:
a plurality of stator segment assemblies each including a stator segment
core, a winding end cap assembly including first and second end caps positioned
adjacent to opposite axial end surfaces of said stator segment core, and windings wound
5 around said first and second end caps and said stator segment core.

26. The stator of claim 25 wherein said first and second end caps include an
outer section, an inner section and a hub section that connects said outer section to said
inner section.

27. The stator of claim 26 wherein said winding end cap assembly includes
first and second inner retainer sections that connect said inner sections of said first and
second end caps together.

28. The stator of claim 27 wherein said winding end cap assembly includes
first and second outer retainer sections that connect one of said outer sections and said
hub sections of said first and second end caps together.

29. A stator segment assembly for an electric machine, comprising:
a stator segment core that includes first and second axial side surfaces;
a first winding retainer section that is positioned along said first axial
side surface; and
5 winding wire that is wound around said stator segment core and that is
retained by said first winding retainer section.

30. The stator segment assembly of claim 29 further comprising:
a second winding retainer section that is connected along said second
axial side surface.

31. The stator segment assembly of claim 29 further comprising:
a third winding retainer section that is connected along said first axial
side surface in a position that is radially outside of said first winding retainer section.

32. The stator segment assembly of claim 30 further comprising:
a fourth winding retainer section that is connected along said second axial
side surface in a position that is radially outside of said second winding retainer section.

33. The stator segment assembly of claim 29 further comprising:

a first end cap that is connected to one end surface of said stator segment core and that is connected to one end of said first winding retainer section;

a second end cap that is connected to an opposite end surface of said

5 stator segment core and that is connected to an opposite end of said first winding retainer section.

34. A stator segment assembly for an electric machine, comprising:
a stator segment core;
a winding retainer attached to said stator segment core, wherein said
winding retainer defines a substantially continuous annular channel around said stator
segment core; and
5 winding wire that is wound in said continuous annular channel.

35. The stator segment assembly of claim 34 wherein said winding retainer is
made of insulating material.